

6. Should the effectively flat portion of the aspheric mirror be some minimum size, as is required of flat mirrors?

7. Should the agency require an etched line on aspheric mirrors to delineate where the intersection of the flat portion of the mirror and the marked curved portion begins? Why?

8. Should the radius of curvature in the more convex portion of aspheric mirrors be limited? What is a reasonable range of allowable radii of curvature? Should the size of this section be limited? What is a reasonable minimum/maximum size for this portion of the mirror? To what extent would allowing multiple types of mirrors compromise safety? How could these effects be minimized? Please provide the basis for these answers.

9. Should the proportion of the size of the effectively flat area to the curved area be specified on aspheric mirrors? Should there be separate field of view requirements for each of the areas? Why?

10. We are aware of the use of aspheric mirrors on vehicles used in Europe and are interested in examining the criteria used for determining their specific characteristics. How much do these mirrors vary within the same or different body sizes and styles? Is there any data on the safety benefits and/or detriments of these mirrors as used in Europe? Please be specific.

11. Should all vehicles with mirror systems using aspheric mirrors on the passenger side and aspheric or convex on the driver side have as a replacement, a flat or convex reflective element that is readily available for consumers to purchase? Should consumers be required to pay for such a replacement, or should they be available at no charge? How would the answers to these questions affect the decision by manufacturers to offer optional mirror systems?

12. Convex and aspheric mirrors can achieve a larger field of view than a like-sized flat mirror. Therefore, with a system that provides interchangeability, the convex and aspheric mirrors will most likely need to be made larger than would be required to accommodate the possibility of replacing with a flat mirror. How would this affect the implementation of optional mirror systems? What would be the cost of supplying interchangeability?

13. Should aspheric or convex mirrors be made mandatory on the driver or passenger side? Please provide justification.

14. Does the agency need to require interior and/or exterior dimming mirrors? Why?

15. If dimming mirrors are required, should they be automatic or actuated by the driver?

16. What price is the public willing to pay for fully automatic inside and outside dimming mirrors on passenger cars? What are they willing to pay for these mirrors on light trucks?

17. What are the benefits and disbenefits of mirror configurations that include more than one mirror surface? An agency field evaluation of commercial van mirrors [Field Evaluation of Rearview Mirror Systems for Commercial Vehicles," September 1985, DOT HS 806-948] found that vehicles equipped with a 40-inch radius of curvature convex mirror had an 18 percent reduction in crashes compared to a dual flat and convex mirror configuration.

18. Are there any other issues that should be addressed in the review of the standard? Please be specific and provide supporting data.

Discussion of Video System Issues

While video systems can be coupled with existing mirrors to create an enhanced view to the driver, it is possible that these systems could completely replace current mirror systems in vehicles. This could present some unique problems. First, unlike mirror systems, video systems consist of electronic equipment that rely on electrical current for activation. If the system fails due to a fault with the electronic components or a lack of power, the driver could be without a rear field of view. The agency is concerned that, if there is not a fail-safe mode for these systems, an unsafe situation could occur. The agency has already prohibited liquid crystal dimmable mirrors because of the insurmountable fail-safe issues.

Replacing mirrors on the outside of the vehicle with video screens on the inside of the vehicle would be a significant change in the manner by which drivers currently obtain the information. Drivers have become used to conventional mirrors, and some could have problems relying on a video screen for the same information. These possible difficulties could be exacerbated by the placement of the monitors. For example, if the monitors were placed outboard as close to the area where the outside rearview mirrors would be, drivers might not experience many problems with the transition. By placing them near the area where conventional mirrors are placed, the geometrical perspective to the object being viewed that is given by the mirrors would be preserved. However, if the monitors were more centrally located on the

instrument panel, the lack of geometric perspective could leave drivers confused as to the relationship of what they are seeing in the monitor to the area around their vehicle. The agency believes that manufacturers are currently attempting to determine how to insure that video systems are easy to use and acceptable to drivers.

As with the optional mirror systems discussed above, allowing the use of video systems would provide an option to manufacturers, and, thus, there would be no cost burden imposed by such a permissive rule change.

Below are questions related to the use of video systems for rear vision. To be considered, you must provide a rationale for your answers.

1. Under what condition, if any, would any failure of a video system be considered acceptable? Why?

2. Given the prohibition of liquid crystal mirrors because of the potential for electrical failure, is there any reason to consider video systems? If so, explain why these would be at least as reliable as a conventional glass mirror.

3. Are there any safety studies available on video systems that would show that their overall safety would be great enough to offset any loss of safety from a failure?

4. What are the long-term safety consequences of failure to replace a failed video system component because of the high cost and/or lack of availability? What additional requirements should be imposed on these optional systems to assure that replacement of failed components is as likely as replacement of today's mirrors?

5. If a video system failure were deemed to be an acceptable risk, should the agency require these systems to provide a failure alert to warn the driver of a system problem? If so, what performance requirements should be established for the system failure alert? If not, please explain why.

6. Should there be a backup system in case of failure? If so, please provide a description of a possible system and why it would achieve an acceptable safety risk. If not, please explain why.

7. Should the location for the video monitors be specified? It is the agency's initial inclination that they should be placed as close as possible to where currently used mirrors are located. What studies have been done to show that any other location is acceptable?

8. If the monitors were placed in an area away from where typical mirrors are mounted, how well would drivers adapt to the new location?

9. Should the agency conduct human factors analysis to examine the interface